Amendments to the Claims

and

Listing of Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

Claims 2, 3, 7, 9, 10, 14, 25, and 28 are amended.
Claims 23, 24, 26, and 27 are canceled without prejudice.

1. (canceled)

2. (currently amended) A semiconductor element comprising:

a semiconductor body made of silicon carbide and including a first conductivity type semiconductor substrate and a first conductivity type epitaxial growth layer formed on the first conductivity type semiconductor substrate;

~~a~~ an insulated gate field-effect transistor including a second conductivity type semiconductor formed in the first conductivity type epitaxial growth layer on a first surface side of the semiconductor body, a first conductivity type source region formed in the second conductivity type semiconductor, a source electrode provided on ~~a~~ the first surface side of ~~a~~ the semiconductor body so as to be in contact with the second conductivity type semiconductor and the source region, a drain electrode provided on a second surface side opposite to the first surface side, a first conductivity type ~~semiconductor that includes a first conductivity type~~ drift region ~~and is~~ included in the ~~semiconductor body~~ first conductivity type epitaxial growth layer, and a gate electrode provided on an insulating film formed on the first surface side ~~and a second conductivity type semiconductor included in the semiconductor body~~; and

a Schottky diode formed by contact between the first conductivity type ~~semiconductor~~ drift region and a plurality of metal electrodes ~~electrode~~,

~~wherein the semiconductor body includes a first conductivity type semiconductor substrate and a first conductivity type epitaxial growth layer formed on the first conductivity type semiconductor substrate,~~

wherein a plurality of the field-effect transistors are arranged, and the metal electrodes of the Schottky diode are provided so as to extend between the transistors, the metal electrodes being disposed on a flat surface, and

wherein the field-effect transistor and the Schottky diode are arranged such that a first depletion layer stemming from the Schottky diode is superimposed on a second depletion layer spreading around the second conductivity type semiconductor in an off-state of the field-effect transistor.

~~wherein the semiconductor body includes a region for a group of transistors in which a plurality of the field-effect transistors are formed, and the field-effect transistors are insulated gate field-effect transistors,~~

~~each of the insulated-gate field-effect transistors further comprising:~~

~~a first conductivity type source region formed in the second conductivity type semiconductor, and a gate electrode provided on an insulating film formed on the first surface side,~~

~~wherein in each of the insulated gate field-effect transistors,~~

~~the second conductivity type semiconductor is provided on the first surface side; and~~

~~the source electrode is provided so as to be in contact with the second conductivity type semiconductor and the source region,~~

~~wherein the Schottky diode is included in the region for a group of transistors and is formed by contact between the drift region exposed between the transistors on the first surface side and the metal electrode.~~

3. (currently amended) A semiconductor element comprising:

a semiconductor body made of silicon carbide and including a first conductivity type semiconductor substrate and a first conductivity type epitaxial growth layer formed on the first conductivity type semiconductor substrate;

~~a~~ an insulated gate field-effect transistor including a second conductivity type semiconductor formed in the first conductivity type epitaxial growth layer on a first surface side of the semiconductor body, a first conductivity type source region formed in the second conductivity type semiconductor, a source electrode provided on ~~a~~ the first surface side of ~~a~~ the semiconductor body so as to be in contact with the second conductivity type semiconductor and

the source region, a drain electrode provided on a second surface side opposite to the first surface side, a first conductivity type ~~semiconductor that includes a first conductivity type~~ drift region ~~and is~~ included in the ~~semiconductor body~~ first conductivity type epitaxial growth layer, a recess that penetrates the source region and the second conductivity type semiconductor to reach the first conductivity type drift region, and a gate electrode on an insulating film formed in the recess ~~and a second conductivity type semiconductor included in the semiconductor body~~; and

a Schottky diode formed by contact between the first conductivity type ~~semiconductor~~ drift region and a plurality of metal electrodes ~~electrode~~,

~~wherein the semiconductor body includes a first conductivity type semiconductor substrate and a first conductivity type epitaxial growth layer formed on the first conductivity type semiconductor substrate,~~

wherein a plurality of the field-effect transistors are arranged, and the metal electrodes of the Schottky diode are provided so as to extend between the transistors, the metal electrodes being disposed on a flat surface, and

wherein the field-effect transistor and the Schottky diode are arranged such that a first depletion layer stemming from the Schottky diode is superimposed on a second depletion layer spreading around the second conductivity type semiconductor in an off-state of the field-effect transistor.

~~wherein the semiconductor body includes a region for a group of transistors in which a plurality of the field-effect transistors are formed, and the field-effect transistors are insulated gate field-effect transistors,~~

~~each of the insulated gate field-effect transistors further comprising:~~

~~a first conductivity type source region formed in the second conductivity type semiconductor, a recess that penetrates the source region and the second conductivity type semiconductor to reach the first conductivity type drift region, and a gate electrode on an insulating film formed in the recess,~~

~~wherein in each of the insulated gate field-effect transistors,~~

~~the second conductivity type semiconductor is provided on the first surface side; and~~

~~the source electrode is provided so as to be in contact with the second conductivity type semiconductor and the source region,~~

~~wherein the Schottky diode is included in the region for a group of transistors and is formed by contact between the drift region exposed between the transistors on the first surface side and the metal electrode.~~

4-6. (canceled)

7. (currently amended) The semiconductor element according to claim ~~23~~ 2, wherein the silicon carbide is obtained by causing epitaxial growth on a surface of a silicon carbide substrate that is either one of the following I and II to form a silicon carbide layer:

I. (111) Si plane of β-SiC, (0001) Si plane of 6H or 4H-SiC, or Si plane of 15R-SiC, or offcut planes within 10 degrees of these Si planes; and

II. (100) plane of β-SiC, (110) plane of β-SiC, (1-100) plane of 6H or 4H-SiC, (11-20) plane of 6H or 4H-SiC, or offcut planes within 15 degrees of these planes.

8. (canceled)

9. (currently amended) A semiconductor element comprising:

a semiconductor body made of silicon carbide and including a first conductivity type semiconductor substrate and a first conductivity type epitaxial growth layer formed on the first conductivity type semiconductor substrate;

~~a~~ an insulated gate field-effect transistor including a second conductivity type semiconductor formed in the first conductivity type epitaxial growth layer on a first surface side of the semiconductor body, a first conductivity type source region formed in the second conductivity type semiconductor, a source electrode provided on ~~a~~ the first surface side of ~~a~~ the semiconductor body so as to be in contact with the second conductivity type semiconductor and the source region, a drain electrode provided on a second surface side opposite to the first surface side, a first conductivity type ~~semiconductor that includes a first conductivity type~~ drift region ~~and is~~ included in the ~~semiconductor body~~ first conductivity type epitaxial growth layer, and a

gate electrode provided on an insulating film formed on the first surface side ~~and a second conductivity type semiconductor included in the semiconductor body~~; and

a Schottky diode formed by contact between the first conductivity type ~~semiconductor~~ drift region and a plurality of metal electrodes ~~electrode~~,

~~wherein the semiconductor body includes a first conductivity type semiconductor substrate and a first conductivity type epitaxial growth layer formed on the first conductivity type semiconductor substrate,~~

wherein a plurality of the field-effect transistors are arranged, and the metal electrodes of the Schottky diode are provided so as to extend between the transistors, the metal electrodes being disposed on a flat surface, and

wherein the field-effect transistor and the Schottky diode are arranged closely so that a second conductivity type semiconductor other than said second conductivity type semiconductor is not interposed between the field effect transistor and the Schottky diode~~,~~

~~wherein the semiconductor body includes a region for a group of transistors in which a plurality of the field-effect transistors are formed, and the field-effect transistors are insulated field-effect transistors,~~

~~each of the insulated-gate field-effect transistors further comprising:~~

~~a first conductivity type source region formed in the second conductivity type semiconductor, and a gate electrode provided on an insulating film formed on the first surface side,~~

~~wherein in each of the insulated-gate field-effect transistors,~~

~~the second conductivity type semiconductor is provided on the first surface side; and~~

~~the source electrode is provided so as to be in contact with the second conductivity type semiconductor and the source region,~~

~~wherein the Schottky diode is included in the region for a group of transistors and is formed by contact between the drift region exposed between the transistors on the first surface side and the metal electrode~~.

10. (currently amended) A semiconductor element comprising:

a semiconductor body made of silicon carbide and including a first conductivity type semiconductor substrate and a first conductivity type epitaxial growth layer formed on the first conductivity type semiconductor substrate;

~~a~~ an insulated gate field-effect transistor including a second conductivity type semiconductor formed in the first conductivity type epitaxial growth layer on a first surface side of the semiconductor body, a first conductivity type source region formed in the second conductivity type semiconductor, a source electrode provided on ~~a~~ the first surface side of ~~a~~ the semiconductor body so as to be in contact with the second conductivity type semiconductor and the source region, a drain electrode provided on a second surface side opposite to the first surface side, a first conductivity type ~~semiconductor that includes a first conductivity type~~ drift region ~~and is~~ included in the ~~semiconductor body~~ first conductivity type epitaxial growth layer, a recess that penetrates the source region and the second conductivity type semiconductor to reach the first conductivity type drift region, and a gate electrode on an insulating film formed in the recess ~~and a second conductivity type semiconductor included in the semiconductor body~~; and

a Schottky diode formed by contact between the first conductivity type ~~semiconductor~~ drift region and a plurality of metal electrodes ~~electrode~~,

~~wherein the semiconductor body includes a first conductivity type semiconductor substrate and a first conductivity type epitaxial growth layer formed on the first conductivity type semiconductor substrate,~~

wherein a plurality of the field-effect transistors are arranged, and the metal electrodes of the Schottky diode are provided so as to extend between the transistors, the metal electrodes being disposed on a flat surface, and

wherein the field-effect transistor and the Schottky diode are arranged closely so that a second conductivity type semiconductor other than said second conductivity type semiconductor is not interposed between the field effect transistor and the Schottky diode~~,~~

~~wherein the semiconductor body includes a region for a group of transistors in which a plurality of the field-effect transistors are formed, and the field-effect transistors are insulated field-effect transistors,~~

~~each of the insulated gate field-effect transistors further comprising:~~

~~a first conductivity type source region formed in the second conductivity type semiconductor, a recess that penetrates the source region and the second conductivity type semiconductor to reach the first conductivity type drift region, and a gate electrode on an insulating film formed in the recess,~~

~~wherein in each of the insulated gate field-effect transistors,~~

~~the second conductivity type semiconductor is provided on the first surface side; and~~

~~the source electrode is provided so as to be in contact with the second conductivity type semiconductor and the source region;~~

~~wherein the Schottky diode is included in the region for a group of transistors and is formed by contact between the drift region exposed between the transistors on the first surface side and the metal electrode~~.

11-13. (canceled)

14. (currently amended) The semiconductor element according to claim ~~26~~ 9, wherein the silicon carbide is obtained by causing epitaxial growth on a surface of a silicon carbide substrate that is either one of the following I and II to form a silicon carbide layer:

I. (111) Si plane of β-SiC, (0001) Si plane of 6H or 4H-SiC, or Si plane of 15R-SiC, or offcut planes within 10 degrees of these Si planes; and

II. (100) plane of β-SiC, (110) plane of β-SiC, (1-100) plane of 6H or 4H-SiC, (11-20) plane of 6H or 4H-SiC, or offcut planes within 15 degrees of these planes.

15. (previously presented) The semiconductor element according to claim 3, wherein, in an on-state of each of the insulated field-effect transistors, a channel extends along the thickness direction of the semiconductor body in the second conductivity type semiconductor, wherein the surface of the recess is covered with an insulating film.

16. (canceled)

17. (previously presented) The semiconductor element according to claim 10, wherein, in an on-state of each of the insulated field-effect transistors, a channel extends along the thickness direction of the semiconductor body in the second conductivity type semiconductor, wherein the surface of the recess is covered with an insulating film.

18-24. (canceled)

25. (currently amended) The semiconductor element according to claim ~~24~~ 3, wherein the silicon carbide is obtained by causing epitaxial growth on a surface of a silicon carbide substrate that is either one of the following I and II to form a silicon carbide layer:

I. (111) Si plane of β-SiC, (0001) Si plane of 6H or 4H-SiC, or Si plane of 15R-SiC, or offcut planes within 10 degrees of these Si planes; and

II. (100) plane of β-SiC, (110) plane of β-SiC, (1-100) plane of 6H or 4H-SiC, (11-20) plane of 6H or 4H-SiC, or offcut planes within 15 degrees of these planes.

26-27. (canceled)

28. (currently amended) The semiconductor element according to claim ~~27~~ 10, wherein the silicon carbide is obtained by causing epitaxial growth on a surface of a silicon carbide substrate that is either one of the following I and II to form a silicon carbide layer:

I. (111) Si plane of β-SiC, (0001) Si plane of 6H or 4H-SiC, or Si plane of 15R-SiC, or offcut planes within 10 degrees of these Si planes; and

II. (100) plane of β-SiC, (110) plane of β-SiC, (1-100) plane of 6H or 4H-SiC, (11-20) plane of 6H or 4H-SiC, or offcut planes within 15 degrees of these planes.